Navy Energy Program

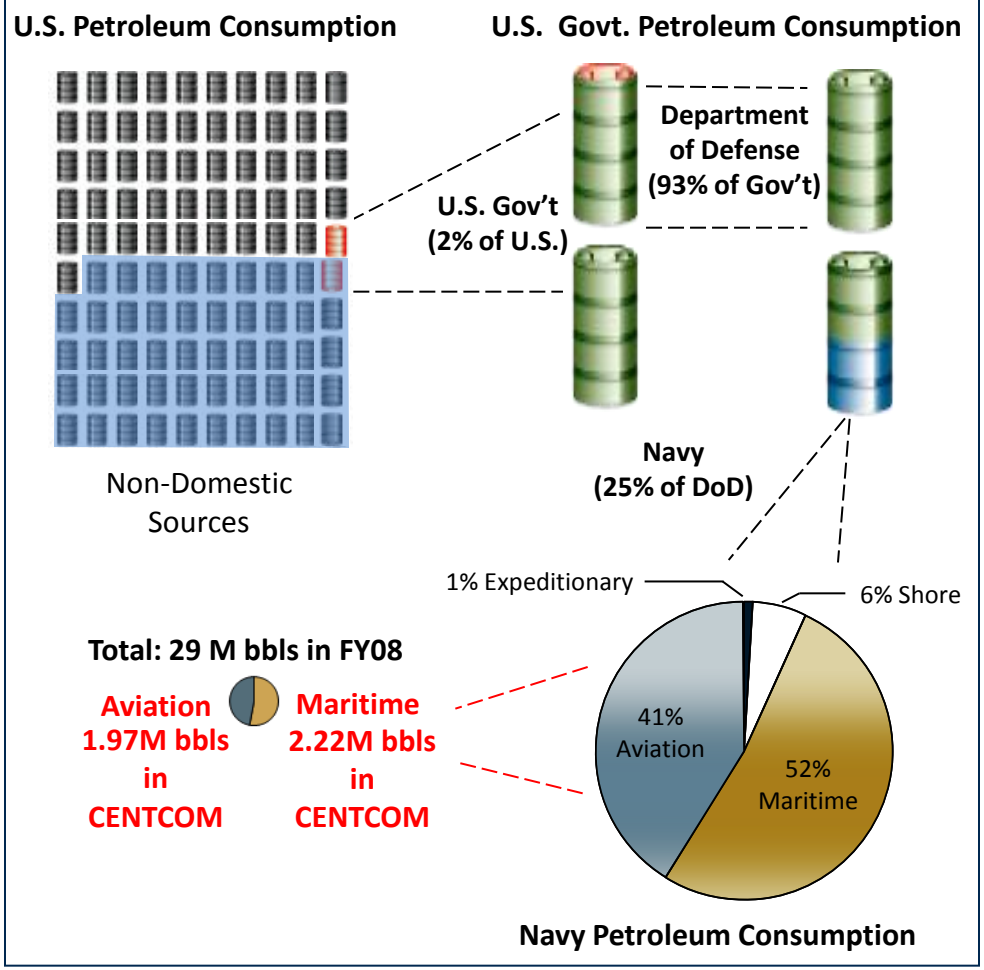
RADM Phil Cullom

Director, Energy and Environmental Readiness (N45)

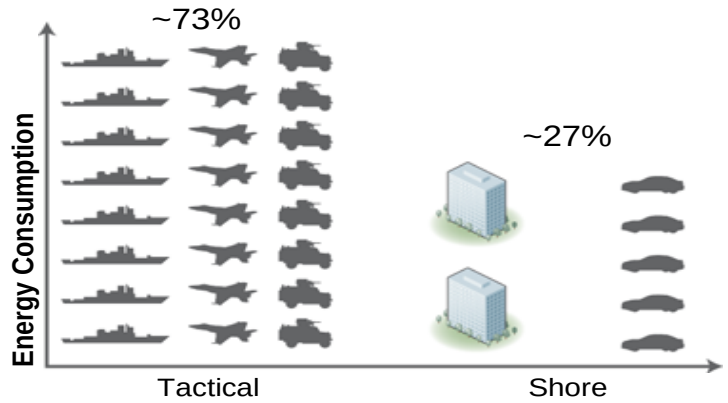
6 December 2011

Navy Energy Profile

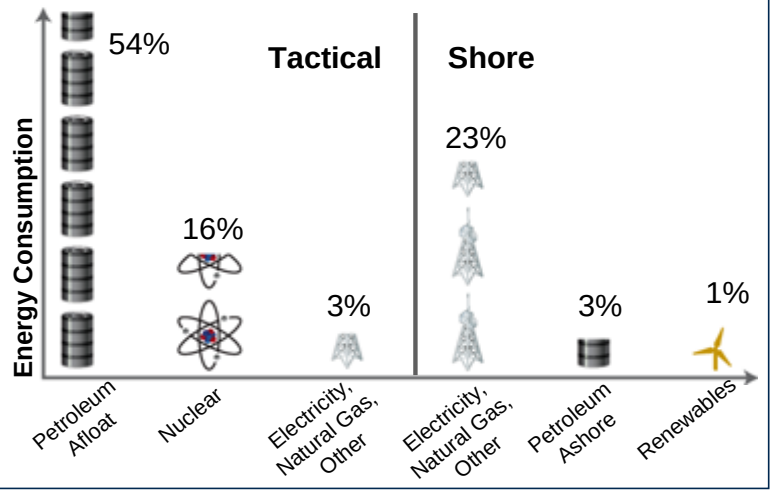
Navy Petroleum Consumption in



Overall Energy Consumption



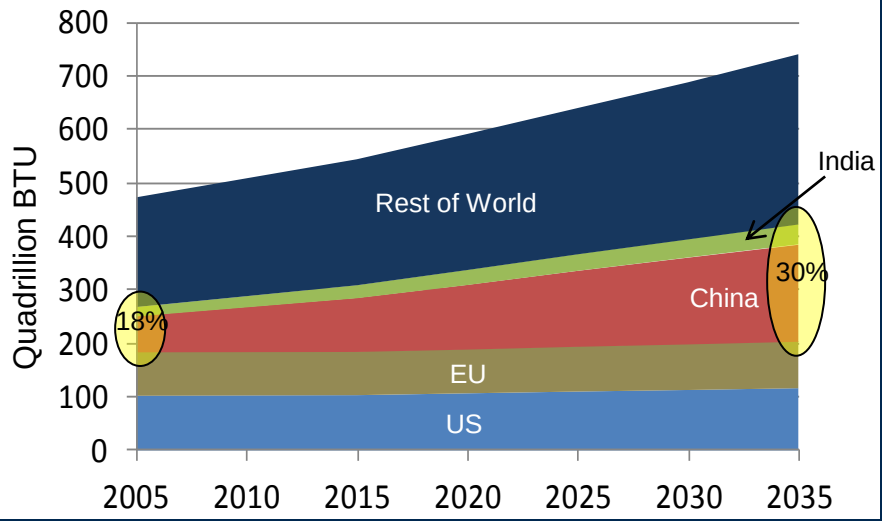
Overall Energy Sources



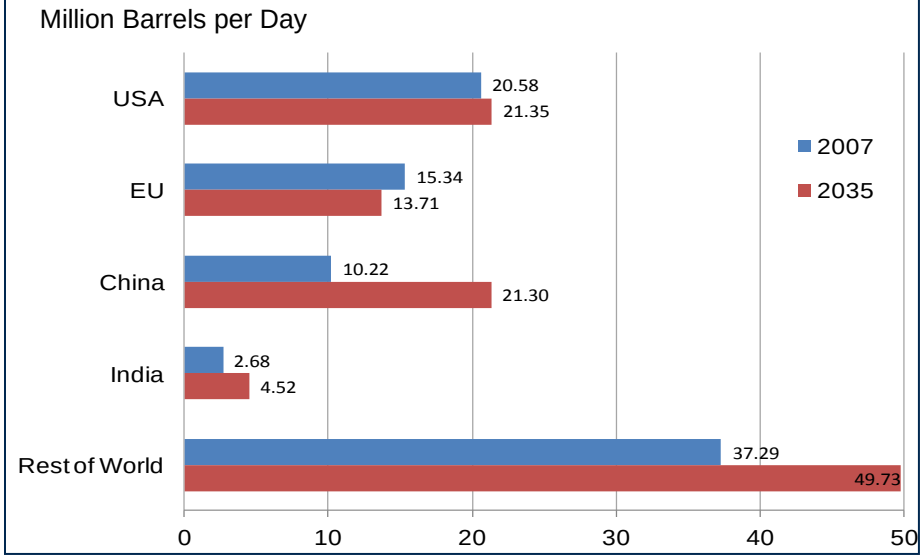
Energy: Our Greatest Combat Enabler… and Greatest Vulnerability.

Evolving Energy Demand Demographic

Worldwide Total Energy Demand* (2005-2035)



Worldwide Liquid Fuel Consumption** (2007 & 2035)



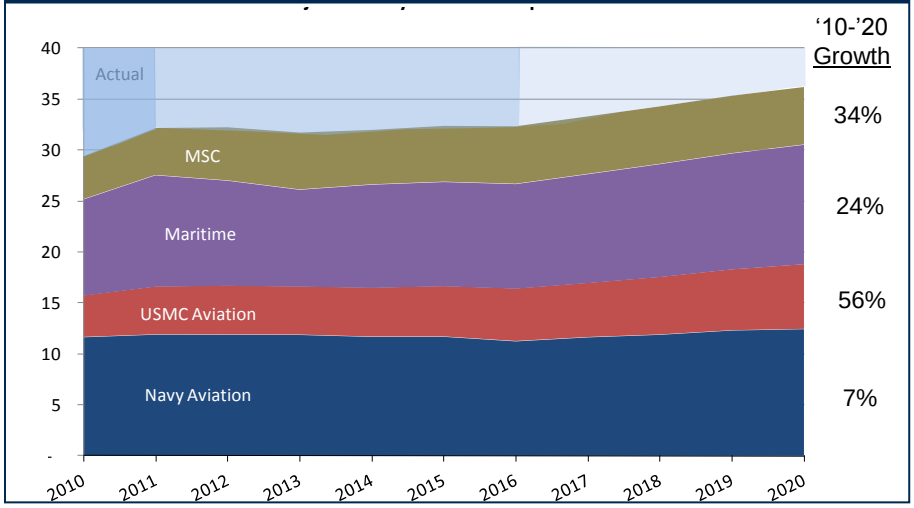
'Chindia' is rapidly becoming the global energy driver

* EIA International Energy Outlook 2010

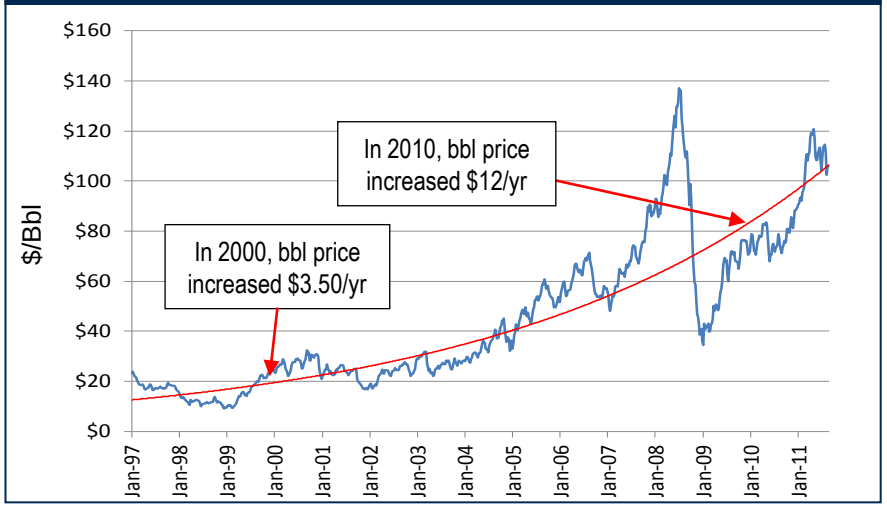
** EIA, International Energy Statistics database (as of November 2009), web site www.eia.gov/emeu/international. 2035: EIA, World Energy Projection System Plus (2010)

Liquid Energy Profiles

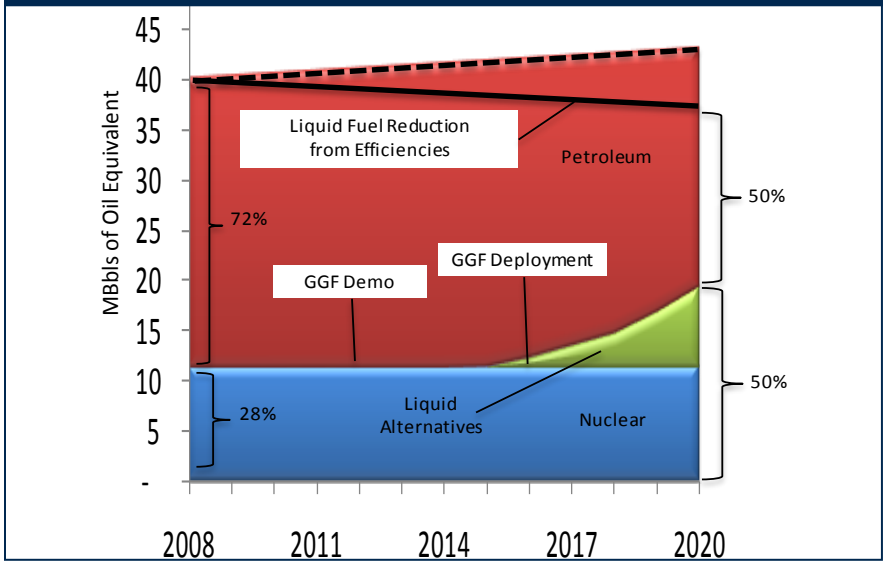
Navy Fuel Consumption



Price Volatility



SECNAV / CNO goals challenge Navy to meet aggressive targets by 2020



- Goal - Strengthen combat capability and reduce volatility by:
  - Reducing Consumption - Efficiency through culture change, retooling existing fleet and energy efficient acquisition
  - Increasing Available Sources - Substitute alternative fuels for liquid fossil fuels

Navy Biofuel Program

Alternative fuel must be a drop-in replacement, invisible to the operator

- ✓Meets current fuel performance requirements
- ✓Can be mixed or alternated with petroleum fuel
- ✓NO change to aircraft or ship configuration
- ✓NO change to transport/storage infrastructure

Current

Hydrotreated Renewables Test & Certification

- ❑ Chemical & Physical Properties
- ❑ Component Performance
- ❑ Platform Performance
- ❑ Long-term Operability

Near-Term Future

Feedstock/Process Validation

- Biological Conversion
- Biomass-Butanol-Fuel
- Pyrolysis
- Others

Longer-term Biofuel Solution

Integrated Alternatives

Multiple Feed-stocks

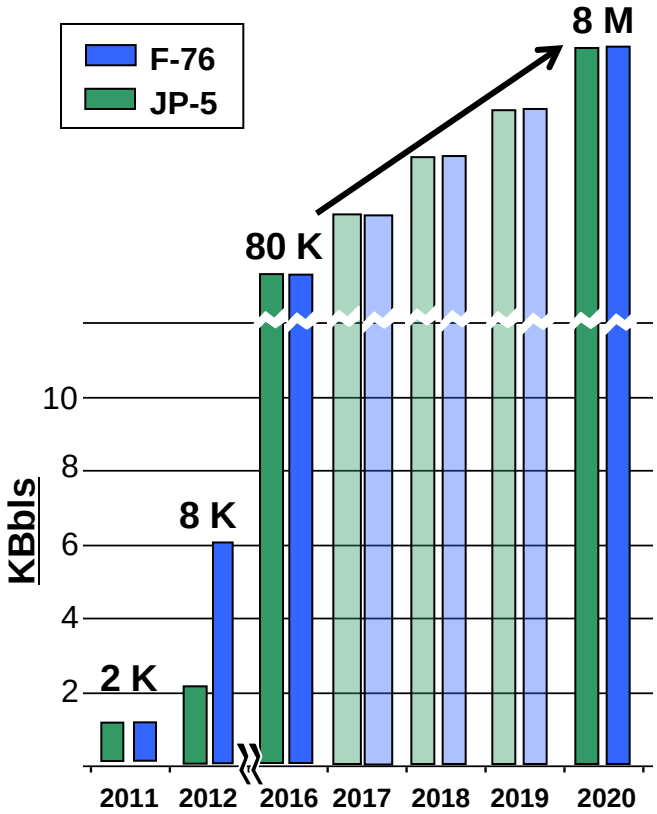
Scale Up

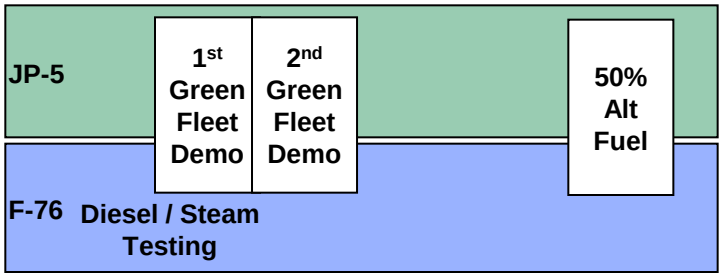
Cost-Effective

Engineer the fuel not the platform

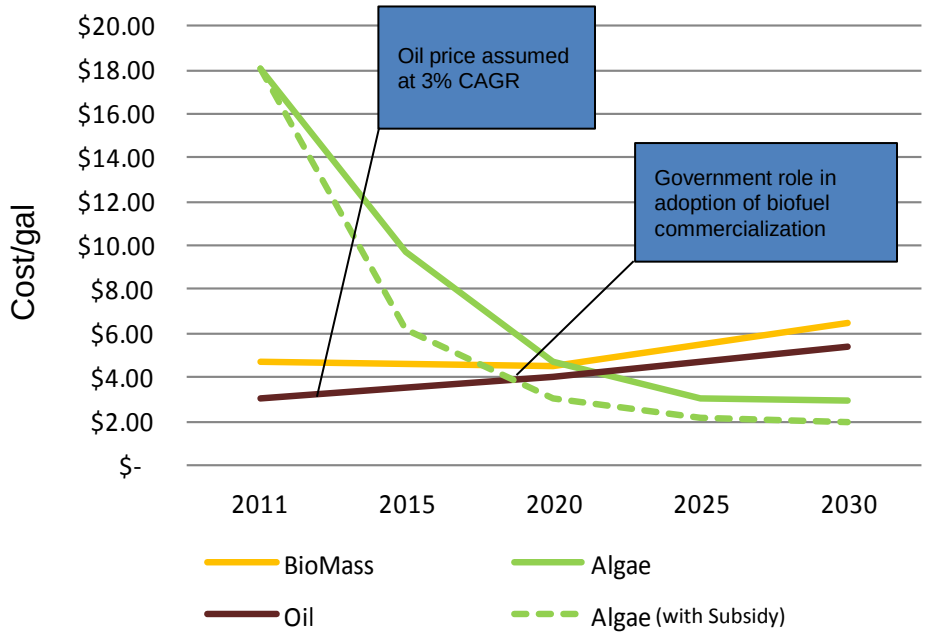
Demand vs. Production Projection

Navy Biofuel Demand



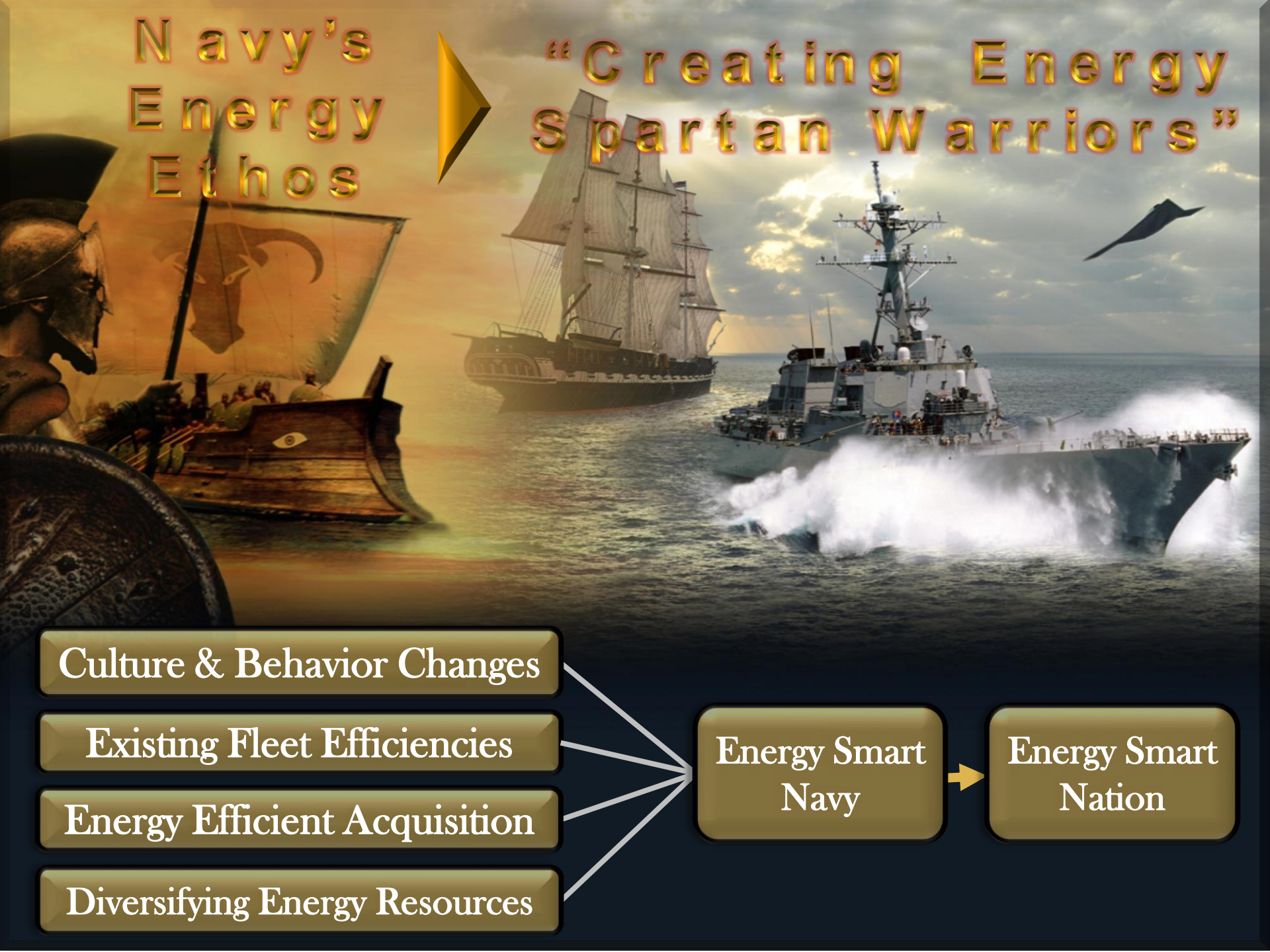


Algae vs. Biomass Fuel Forecast*



* MIT Sloan School of Management L-Lab Biofuel Study 2010

Incentivized scale up of advanced biofuel industry could shorten the timeframe to price parity


Navy's Energy Ethos
"Creating Energy Spartan Warriors"
Culture & Behavior Changes
Existing Fleet Efficiencies
Energy Efficient Acquisition
Diversifying Energy Resources
Energy Smart Navy
Energy Smart Nation